

## California Cancer Commission Studies\*

## Chapter XIV

## Cancer of the Larynx

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OF all the malignant neoplastic diseases to which the human body may be host, intrinsic cancer of the larynx is exceeded only by skin cancer in its chance of cure. Early diagnosis and efficient treatment are readily available. There is no internal region of the body where cancer makes known its presence as early as in the larynx, (hoarseness, dysphonia). The site of origin of the malignant new growth is generally within the larynx where it is confined for a relatively long time; extension to the cervical lymph nodes and perilaryngeal structures is a late event. Here, then, is a situation in which there is an unusually favorable opportunity for successful treatment.

## INCIDENCE

About 4 per cent of cancers in man arise in the larynx. Cancer of the larynx can occur at any age, but the greatest incidence is in the fifth and sixth decades. Males are affected about ten times more frequently than females, but in the last few decades the incidence in women seems to be increasing. There is one form of laryngeal cancer that for some unknown reason occurs about seven times more frequently in the female. This is the postcricoid cancer which arises from the posterior surface of the cricoid area.

## ETIOLOGY

While the causes of malignant growth are not yet known, there are certain factors that seem to induce its occurrence in the larynx. Abuse of vocal cords, tobacco smoking, alcohol, and chronic laryngitis from whatever cause seem to be exciting factors. Heredity apparently plays a minor role in the development of laryngeal cancer. Leukoplakia and hyperkeratosis have been known to metamorphose into cancer.

## PATHOLOGY

By far the greatest majority of malignant tumors of the larynx are of epithelial origin, and Jackson and Jackson state that 93 per cent are epidermoid or squamous cell carcinoma. Basal cell carcinoma and adenocarcinoma are occasionally found, and mesothelial malignant tumors such as fibrosarcoma, osteosarcoma, chondrosarcoma, endothelioma, and the various type of malignant lymphoma are also occasionally encountered. We need consider here only the epidermoid carcinoma which, according to Broders, may be classified into four degrees of malignancy. In the lower degrees of malignancy the neoplastic cells are more uniform in size and the nuclei tend to be small; there may be considerable fibrous stroma in the tumor, the percentage of kera-

tin is high, and pearl formation is noted. In the higher degrees of malignancy, there is greater variation in size and shape of cells, the nuclei are larger, there is much less stroma to the tumor, and mitotic figures frequently may be seen.

The type of carcinoma is determined by the nature of the epithelium at the site of origin and the characteristics of its construction will follow the type of the parent cell. Thus laryngeal cancers generally fall into one of two categories. The first are of a low grade malignancy and most frequently arise from the squamous epithelium of the true vocal cords. These grow slowly, are for a long time localized, and extend to regional lymph nodes only late in the disease. This type was formerly thought to be radio-resistant.\* The cancers of high grade malignancy usually are of extra cordal origin and spring from columnar epithelium. These are more rapid in growth and are usually more radiosensitive, but the prognosis is poorer. They are also much less amenable to surgical treatment.

The gross pathologic changes of laryngeal cancer have long been a somewhat confused subject. In laryngeal parlance, the terms intrinsic and extrinsic have long been in use although they do not give very exact information as to the site of the cancer. Intrinsic lesions are those confined within the larynx from the laryngeal introitus to the subglottic region (Figure 1). Extrinsic lesions are those involving the epiglottis, aryepiglottic folds, arytenoids, pyriform sinuses or postcricoid area (Figure 2). For clinical purposes perhaps it would be more practical to refer to "cordal cancer" and "extra cordal cancer." Approximately 85 per cent of the laryngeal cancers arise from the squamous epithelium of the true vocal cords and produce the symptom of hoarseness at an early stage. In the main, these tumors tend to be of low grade malignancy. The neoplastic process slowly extends along the cord longitudinally and may cross over the anterior commissure to the opposite cord. The process also extends through the muscles and tendons of the cord toward the laryngeal cartilages until the cord is fixed in a state of immotility. From here the tumor may extend to the cartilages and through them, subglottically and break through the cricothyroid membrane, or anteriorly and upward and invade the pre-epiglottic space. The lymphatic drainage system from the inside of the larynx to the neck is poor, and most of the lymph radicals exit through one small opening in the cricothyroid membrane.

Tumors arising within the larynx from sites other than the true cords (false cords, ventricles, inter-

\* Organized by the Editorial Committee of the California Cancer Commission.

\* See treatment.

arytenoid space) arise from columnar and not squamous epithelium. They tend to be of a higher grade of malignancy and to spread much faster. The symptom of *hoarseness* may not be produced at once. Tumors arising on the epiglottis, aryepiglottic folds, arytenoids and pyriform sinuses are usually of a higher grade of malignancy also. The initial symptoms of all the extra cordal lesions are less obvious and harder to associate with laryngeal disease than is hoarseness, but there is usually *severe pain located in the throat, a pain referred to the ear, a lump in the throat, or disturbance in swallowing*. Even in extra cordal lesions hoarseness eventually develops, but not until the tumor has had a chance to get a good start. *Blood spitting* may be a symptom and as extrinsic lesions proliferate, fatal hemorrhage may occur. Lesions within the larynx, if allowed to proliferate without treatment, will gradually close off the airway and there will be a slowly progressive difficulty in breathing with an inspiratory prolongation of the respiratory cycle and with tracheotomy or suffocation in the offing.

#### DIAGNOSIS

*Hoarseness or dysphonia is a constant and early symptom of cordal cancer.* Persistent hoarseness at any age should be viewed with suspicion. It calls for complete laryngeal examination. Indirect or mirror examination is so easily done that it should always be a part of a routine throat examination. Direct laryngoscopy must be done if for any reason the indirect method is not satisfactory. The final arbiter is biopsy with histological diagnosis. After a preliminary indirect examination has been made and the possible presence of a new growth determined, a specimen is removed by direct laryngoscopy with a small punch forceps. The tissue is examined in the laboratory and if a positive diagnosis is not made the biopsy should be repeated. The importance of early tissue examination can not be overemphasized, for on that depends the diagnosis. Also it is a factor in the selection of treatment.

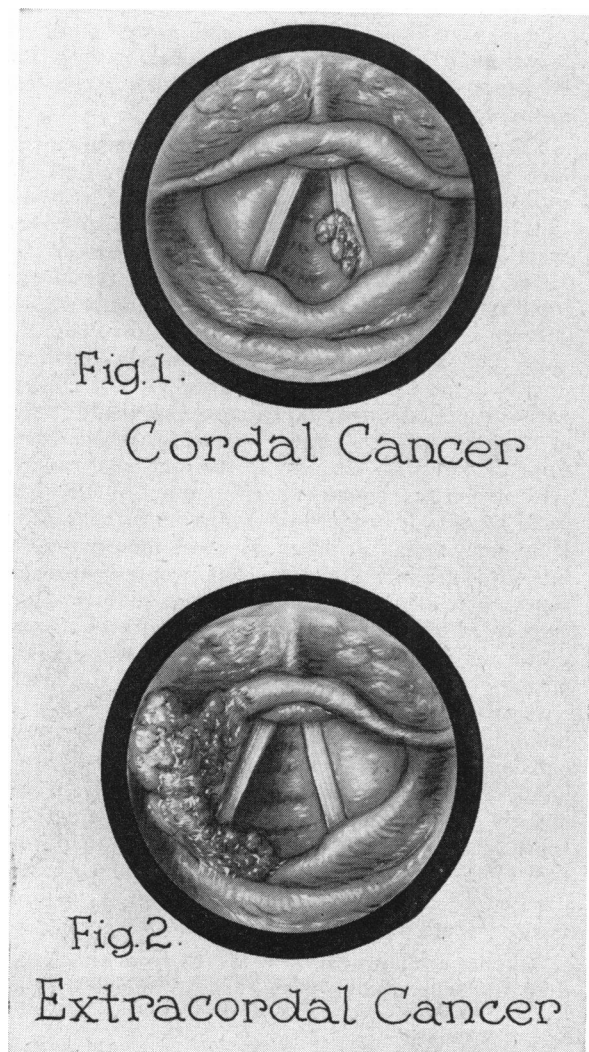
#### TREATMENT

The objective of treatment is the complete removal or destruction of the cancer, with the patient left in a satisfactory physiological condition. The selection of the treatment must be governed by the site of the lesion, the extent of involvement, and the grade of malignancy. The methods of treatment are surgical operation, or irradiation, or a combination of both.

Irradiation treatment has been developed in the last 20 years to a high degree of efficiency, but of course it is of no value if the cancer is not radio-sensitive. Highly malignant tumors which are usually of extra cordal origin are best treated by irradiation. The method generally used is the protracted fractional method originated by Coutard. If irradiation treatment does not make satisfactory progress surgical operation may be of value. In cases in which operation has been tried first and has failed, irradiation is usually tried, although it is seldom of much use. Because the choice too often rests with the patient and not with one who is competent to direct treatment, irradiation is often employed when surgical treatment would give a much better chance of cure.

For cancers of low grade malignancy, surgical treatment offers a good prognosis since these tumors remain local for a long time. Cordal cancer in which the cord is motile and the lesion is not too far anterior to involve the anterior commissure or too far posterior to involve the vocal process, is best treated by laryngofissure (thyrotomy). The true vocal cord and pericordal tissue, together with the inner perichondrium of the thyroid cartilage, is removed. This gives 80 per cent to 90 per cent five-year cures. The voice, while changed by this procedure, is generally good.

If the cord is fixed, then the cancer has infiltrated into deeper structures and possibly has invaded the cartilage. If the cord has only recently become fixed and if the lesion appears confined to the cord within the larynx, laryngofissure with removal of the un-



derlying thyroid cartilage is done. Total laryngectomy is the operation of choice if the cancer has extended beyond the confines of the true cord, either above, below, or to the opposite side. Laryngectomy will give about 60 per cent five-year cures in such cases. Successful laryngectomy leaves the patient much less handicapped than is generally supposed. He can enjoy life and although he has lost normal speech he can learn a new method of talking either with an esophageal voice or by using an artificial larynx.

\* See note by Editorial Committee.

#### SUMMARY

1. Persistent hoarseness, laryngeal pain, or changes in the voice which cannot be accounted for at any age should be viewed with suspicion and early laryngeal examination should be made.

2. Early biopsy and tissue examination is essential in diagnosis and the selection of treatment.

3. The choice of treatment should be governed by the site of the lesion, extent of involvement, and the grade of malignancy.

4. The treatment should be individualized.

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#### \* Comment by Editorial Committee:

It used to be thought that in the larynx, surgical operation and radiation therapy complemented one another. It was believed that intrinsic lesions must be attacked surgically since they were probably radioresistant, while extrinsic lesions, presenting a much poorer surgical prognosis, were radiosensitive. Experience since has shown that instead of being complementary, surgical and radiation therapy are parallel weapons. It is recognized that radiosensitivity and radiocurability are not synonymous, and, further, that degree of cell differentiation is only a very rough index of either, particularly since the same tumor may show areas of different grade and only a tiny sample is obtainable for biopsy.

All factors must be evaluated in each case in planning treatment. The decision has become harder since it has been demonstrated that in early cordal lesions and 85 per cent "cure" rate, without voice impairment, has been achieved by irradiation. Conversely, the poor roentgen salvage of the extrinsic lesions may possibly be bettered by radical surgical removal (total laryngectomy).

There is a growing trend toward applying a therapeutic trial of complete irradiation, to be followed later by surgery if response is poor. The increase in the surgical difficulties secondary to irradiation is largely mythical. A more weighty objection is the loss of time and increased discomfort in cases of radiation failure.



## Chapter XVI

# Carcinoma of the Lung

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**C**ARCINOMA of the lung is found in 10 per cent of men with cancer coming to autopsy; it is second in incidence to carcinoma of the stomach. The development of a safe surgical technique for total pneumonectomy has far surpassed clinical advances for the earlier diagnosis of this lesion. The low surgical mortality attending such operations should be a vital stimulus to all physicians to make an early diagnosis of a common disease which can be cured only by surgical extirpation.

According to reliable statistics, the actual incidence of the disease is on the increase. As with other carcinoma, the cases occur in greatest number in patients between the ages of 40 and 60 years, and there seems to be a slightly greater incidence in the right lung than in the left. It is more common in males, the ratio of incidence being four to one, with some physicians reporting a ratio as high as eight to one.

#### SYMPTOMS

The symptoms are essentially the same as those of inflammation. Variations depend on the location and size of the tumor and the degree of obstruction and

ulceration of the bronchus. The vast majority of the patients complain of *cough as the earliest symptom*. Frequently they volunteer that they have a dry "cigarette cough" which later usually becomes productive of mucoid sputum. As the lumen of the bronchus becomes obstructed, the retained secretions become infected and the cough yields purulent sputum.

*Chills and fever* are an indication of the retention of infected secretions, and an erroneous diagnosis of pneumonia, pneumonitis or influenza is frequently made.

*Wheezing*, at first intermittent, sometimes becoming constant for a while and then suddenly disappearing with complete occlusion of a bronchus by the tumor, is a common complaint. This sequence of development is usually elicited by carefully questioning the patient.

*Pain* is a very common symptom, varying from a discomfort, or a feeling of tightness or oppression, or a characteristic pleuritic pain of varying degree, to the severe intractable pain due to the tumor invasion of the brachial plexus or the intercostal nerves. Severe pain is usually indicative of mediastinal,